

Application No. 10/840,107
Response dated: April 20, 2006
Reply to Office Action dated: February 1, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listing, of claims in the application.

Listing of Claims:

1. (Currently Amended) An array substrate comprising:
a transparent substrate including a reflective window that reflects an ambient light and a transmissive window that transmits an artificial light;
an organic insulation layer disposed over the transparent substrate, the organic insulation layer being thinner gradually at a boundary between the transmissive window and the reflective window;
a pixel electrode formed in the transmissive region and the reflective window;
a reflective layer disposed over the organic insulation layer of the reflective window;
a light blocking pattern disposed at the boundary between the transmissive window and the reflective window to prevent a light leakage; and
a switching part that is electrically connected to a gate line, a source line and the pixel electrode to apply an image signal to the pixel electrode.
2. (Original) The array substrate of claim 1, further comprising an alignment film rubbed along a rubbing direction, wherein the organic insulation layer has a first boundary between the reflective window and the transmissive window disposed in that sequence along the rubbing direction, and a second boundary between the transmissive window and the reflective window in that sequence along the rubbing direction.
3. (Original) The array substrate of claim 2, wherein the light blocking pattern is disposed at the first boundary.
4. (Original) The array substrate of claim 3, wherein the light blocking pattern is protruded from the gate line along the source line, the light blocking pattern is longer than a side

Application No. 10/840,107
Response dated: April 20, 2006
Reply to Office Action dated: February 1, 2006

portion of the transmissive window, and the light blocking pattern overlaps with the side portion of the transmissive window by a first length.

5. (Original) The array substrate of claim 4, wherein the first length is no less than an orthogonal projection of the first boundary.

6. (Withdrawn) The array substrate of claim 3, wherein the light blocking pattern is spaced apart from the gate line, the light blocking pattern is longer than a side portion of the transmissive window, and the light blocking pattern overlaps with the side portion of the transmissive window by a first length.

7. (Withdrawn) The array substrate of claim 6, wherein the first length is no less than an orthogonal projection of the first boundary.

8. (Original) The array substrate of claim 3, wherein the second boundary is inclined steeper than the first boundary.

9. (Original) The array substrate of claim 2, wherein the light blocking pattern is disposed at the first and second boundaries.

10. (Withdrawn) The array substrate of claim 9, wherein the light blocking pattern is protruded from the gate line along the source line, the light blocking pattern is longer than a side portion of a first transmissive window and a second side portion of a second transmissive window adjacent to the first transmissive window with the source line interposed therebetween, and the light blocking pattern overlaps with the first side portion and with second side portion.

11. (Withdrawn) The array substrate of claim 10, wherein the light blocking pattern overlaps with the first side portion by a first length and with the second side portion by a second length.

Application No. 10/840,107
Response dated: April 20, 2006
Reply to Office Action dated: February 1, 2006

12. (Withdrawn) The array substrate of claim 11, wherein the first length is no less than an orthogonal projection of the first boundary, and the second length is no less than an orthogonal projection of the second boundary.

13. (Withdrawn) The array substrate of claim 9, wherein the light blocking pattern includes a first and second floating wirings spaced apart from the gate line, the first and second floating wirings are longer than a side portion of a first transmissive window and a second side portion of a second transmissive window adjacent to the first transmissive window with the source line interposed therebetween, and the first and second floating wirings overlap with the first and second side portions, respectively.

14. (Withdrawn) The array substrate of claim 10, wherein the first floating wiring overlaps with the first side portion by a first length, the second floating wiring overlaps with the second side portion by a second length, and the first and second floating wirings overlap with the source line.

15. (Withdrawn) The array substrate of claim 11, wherein the first length is no less than an orthogonal projection of the first boundary, and the second length is no less than an orthogonal projection of the second boundary.

16. (Original) The array substrate of claim 9, wherein the second boundary is inclined steeper than the first boundary.

17. (Original) The array substrate of claim 1, wherein the organic insulation layer is formed in the reflective and transmissive windows, the organic insulation layer of the reflective window has a first thickness and the organic insulation layer of the transmissive window has a second thickness that is thinner than the first thickness.

18. (Original) The array substrate of claim 1, wherein the organic insulation layer is formed in the reflective windows.

Application No. 10/840,107
Response dated: April 20, 2006
Reply to Office Action dated: February 1, 2006

19. (Original) The array substrate of claim 1, wherein the switching part corresponds to a thin film transistor having a gate electrode protruded from the gate line, a source electrode protruded from the source line, and a drain electrode that is spaced apart from the source electrode.

20. (Original) The array substrate of claim 9, further comprising a storage capacitor including a first storage electrode disposed on the transparent substrate such that the first storage electrode is extended substantially parallel with the gate line.

21. (Original) The array substrate of claim 9, wherein the gate line and the source line are formed on a first surface of the transparent substrate, and the light blocking pattern is formed on a second surface of the transparent substrate such that the light blocking pattern is substantially parallel with the source line.

22. (Withdrawn) A method of forming an array substrate, comprising:
forming a first thin film on a transparent substrate;
patterning the first thin film to form a gate line, a gate electrode protruded from the gate line and a light blocking pattern;
forming a gate insulation layer and a semiconductor layer over the transparent substrate having the light blocking pattern;
forming a second thin film on the semiconductor layer;
patterning the second thin film to form a source line, a source electrode protruded from the source line and a drain electrode that is spaced apart from the source electrode, the gate, source and drain electrodes forming a switching device;
coating an organic insulation layer on the transparent substrate having the switching device formed thereon;
removing a portion of the organic insulation layer to form a contact hole through which the drain electrode is exposed, and a transmissive window such that a side portion of the transmissive window overlaps with the light blocking pattern;

Application No. 10/840,107
Response dated: April 20, 2006
Reply to Office Action dated: February 1, 2006

forming a pixel electrode that is electrically connected to the drain electrode via the contact hole over the organic insulation layer; and
forming a reflective layer over the organic insulation layer to form a reflective window.

23. (Withdrawn) The method of claim 22, wherein the light blocking pattern protruded, such that the light blocking pattern is substantially parallel with the source line.

24. (Withdrawn) The method of claim 23, wherein the portion of the organic insulation layer is removed to have a first boundary between the reflective window and the transmissive window disposed in that sequence along a rubbing direction, and a second boundary between the transmissive window and the reflective window in that sequence along the rubbing direction, the first boundary being disposed over the light blocking pattern and a length of a side portion of the transmissive window being shorter than the light blocking pattern, so that the side portion is screened by the light blocking pattern.

25. (Withdrawn) The method of claim 24, wherein the second boundary is disposed over the light blocking pattern.

26. (Withdrawn) The method of claim 25, wherein the organic insulation layer is removed by:

exposing firstly the organic insulation layer to form the contact hole; and
exposing secondly the organic insulation layer to form the transmissive window.

27. (Withdrawn) The method of claim 26, wherein the transmissive window is formed by:

exposing partially an upper portion of the first boundary;
slit exposing a lower portion of the first boundary; and
exposing partially the lower portion of the first boundary.

Application No. 10/840,107
Response dated: April 20, 2006
Reply to Office Action dated: February 1, 2006

28. (Withdrawn) The method of claim 22, wherein the light blocking pattern corresponds to a floating line extended substantially in parallel with the source line, the floating line being spaced apart from the gate line.

29. (Withdrawn) The method of claim 28, wherein the portion of the organic insulation layer is removed to have a first boundary between the reflective window and the transmissive window disposed in that sequence along a rubbing direction, and a second boundary between the transmissive window and the reflective window in that sequence along the rubbing direction, the first boundary being disposed over the floating line and a length of a side portion of the transmissive window being shorter than the floating line, so that the side portion is screened by the floating line.

30. (Withdrawn) The method of claim 29, wherein the second boundary is disposed over the floating line.

31. (Withdrawn) The method of claim 30, wherein the light blocking pattern includes first and second floating lines disposed symmetrically with respect to the source line.

32. (Withdrawn) The method of claim 31, wherein the portion of the organic insulation layer is removed to have a first boundary between the reflective window and the transmissive window disposed in that sequence along a rubbing direction, and a second boundary between the transmissive window and the reflective window in that sequence along the rubbing direction, the first and second boundaries being disposed over the first and second floating lines, respectively and a length of a side portion of the transmissive window being shorter than the first and second floating lines.

33. (Withdrawn) A liquid crystal display apparatus comprising:
an upper substrate having a color filter;
a lower substrate facing the upper substrate, the lower substrate including:

Application No. 10/840,107
Response dated: April 20, 2006
Reply to Office Action dated: February 1, 2006

a pixel portion having a reflective window that reflects an ambient light and a transmissive window that transmits an artificial light;
an organic insulation layer having an inclined portion that is disposed at a boundary of the reflective window and the transmissive window; and
a light blocking pattern disposed at the boundary to intercept a portion of the artificial light that is leaked from the boundary; and
a liquid crystal layer interposed between the upper substrate and the lower substrate.

34. (Withdrawn) The liquid crystal display apparatus of claim 33, wherein the lower substrate further includes a reflective layer disposed on the organic insulation layer of reflective region and an alignment film that is rubbed to align liquid crystal molecules of the liquid crystal layer along a rubbing direction, the inclined portion includes a first boundary between the reflective window and the transmissive window disposed in that sequence along a rubbing direction and a second boundary between the transmissive window and the reflective window in that sequence along the rubbing direction, and an inclination angle corresponding to the first boundary is smaller than an inclination angle corresponding to the second boundary.

35. (Withdrawn) The liquid crystal display apparatus of claim 34, wherein the light blocking pattern is disposed under the first boundary.

36. (Withdrawn) The liquid crystal display apparatus of claim 35, wherein the light blocking pattern is protruded substantially in parallel with the source line.

37. (Withdrawn) The liquid crystal display apparatus of claim 35, wherein the light blocking pattern corresponds to a floating line extended substantially in parallel with the source line and spaced apart from the gate line.

Application No. 10/840,107
Response dated: April 20, 2006
Reply to Office Action dated: February 1, 2006

38. (New) An array substrate comprising:

a transparent substrate including a reflective window that reflects an ambient light and a transmissive window that transmits an artificial light;

an organic insulation layer disposed over the transparent substrate, the organic insulation layer being thinner gradually at a boundary between the transmissive window and the reflective window;

a pixel electrode formed in the transmissive region and the reflective window;

a reflective layer disposed over the organic insulation layer of the reflective window;

a light blocking pattern disposed at the boundary between the transmissive window and the reflective window to prevent a light leakage;

a switching part that is electrically connected to a gate line, a source line and the pixel electrode to apply an image signal to the pixel electrode; and

an alignment film rubbed along a rubbing direction, wherein the organic insulation layer comprises a first boundary between the reflective window and the transmissive window disposed in that sequence along the rubbing direction and a second boundary between the transmissive window and the reflective window in that sequence along the rubbing direction;

wherein the light blocking pattern is disposed at the first boundary.